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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR          | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|-------------------------------|---------------------|------------------|
| 09/804,004      | 03/12/2001  | Marcel Eduard Irene Broekaart | NL 000314           | 8862             |

7590 05/09/2002

U.S. Philips Corporation  
580 White Plains road  
Tarrytown, NY 10591

EXAMINER

COLLINS, DEVEN M

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 05/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                 |  |                  |  |
|------------------------------|-----------------|--|------------------|--|
| <b>Office Action Summary</b> | Application No. |  | Applicant(s)     |  |
|                              | 09/804,004      |  | BROEKAART ET AL. |  |
|                              | Examiner        |  | Art Unit         |  |
|                              | D. M. Collins   |  | 2823             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 July 2001.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> | 6) <input type="checkbox"/> Other: _____                                    |

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being unpatentable over Boeck et al. (5,880,018, dated 3/9/99).

Boeck et al. show the method as claimed in the Figures 14-15 with corresponding text. In re claim 1, Boeck et al. disclose a method of manufacturing an electronic device, a semiconductor device 50 in particular but not exclusively, which method comprises the steps of:

- applying a semiconductor substrate which is provided with a conductor 54 at a surface, the conductor 54 having a top surface portion and sidewall portions, of which at least the top surface portion is provided with an etch stop layer 56,
- applying a dielectric layer,
- etching a via 68 in the dielectric layer (58, 62) over the conductor 54, and stopping

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on the etch stop layer 56 to create an exposed part of the etch stop layer 16, removing the exposed part of the etch stop layer 56 inside the via 68 from at least the top surface portion of the conductor 54,

- filling the via 68 with a conductive material 66 characterized in that a layer comprising silicon carbide is applied as the etch stop layer 56.

In re claim 2, Boeck et al. disclose a method as claimed in claim 1, characterized in that the etch stop layer 56 is applied to the top surface portion and the sidewall portions of the conductor 54 after the provision of the conductor 54 at the surface of the semiconductor substrate.

In re claim 3, Boeck et al. disclose a method as claimed in claim 2, characterized in that the via 68 is etched while overhanging at least one of the sidewall portions of the conductor 54 and exposing at least part of the etch stop layer 56, which etch stop layer 56 covers the top surface portion and the at least one of the sidewall portions of the conductor 54.

In re claim 4, Boeck et al. disclose a method as claimed in claim 3, characterized in that the etch stop layer 56 is removed from inside the via 68 from only the top surface portion of the conductor 54.

In re claim 5, Boeck et al. disclose a method as claimed in claim 2, characterized in that the etch stop layer 56 is applied to the top surface portion and the sidewall portions of the conductor 54 as well as to portions of the semiconductor substrate which are not covered by the conductor 54.

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In re claim 6, Boeck et al. disclose a method as claimed in claim 1, characterized in that the conductor 54 is provided while comprised at least in part of a material selected from a group comprising aluminum, copper and tungsten.

In re claim 7, Boeck et al. disclose a method as claimed in claim 1, characterized in that the conductor 54 is provided comprising a capping layer 66, which capping layer 66 provides the top surface portion of the conductor 54.

In re claim 8, Boeck et al. disclose a method as claimed in claim 7, characterized in that the capping layer 66 is comprised of a material selected from a group comprising titanium nitride, titanium tungsten and tantalum nitride.

In re claim 9, Boeck et al. disclose a method as claimed in claim 1, characterized in that the dielectric layer (58, 62) is applied by depositing a dielectric material having a dielectric constant lower than that of silicon oxide.

In re claim 10, Boeck et al. disclose a method as claimed in claim 9, characterized in that the dielectric layer (58, 62) is applied by depositing a material selected from a group comprising hydrogen silsesquioxane, parylene and a fluorinated polyimide.

In re claim 11, Boeck et al. disclose a method as claimed in claim 1, characterized in that the via 68 is filled by depositing a conductive layer 54, which conductive layer 54 comprises a metal selected from a group comprising aluminum, copper and tungsten.

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*Conclusion*

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Deven M. Collins whose telephone number is (703) 305-7840.

The examiner can normally be reached on Monday-Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy, can be reached on (703) 308-4918. The fax phone number for this Group is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

DMC

April 8, 2002

  
SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER